DOCUMENT RESUME

ED 440 198 UD 033 493

TITLE	How Small Classes Help Teachers Do Their Best: Recommendations from a National Invitational Conference.
INSTITUTION	National Research Center on Education in the Inner Cities, Philadelphia, PA.
SPONS AGENCY	Mid-Atlantic Lab. for Student Success, Philadelphia, PA.; Department of Education, Washington, DC.
PUB DATE	2000-03-00
NOTE	26p.
PUB TYPE	Collected Works - Proceedings (021) -- Collected Works - Serials (022)
JOURNAL CIT	CEIC Review; v9 n2 Mar 2000
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Class Size; Educational Practices; Elementary Secondary Education; Information Dissemination; Professional Development; Research Needs; *Small Classes; Teacher Student Ratio

ABSTRACT

This theme issue provides a synopsis of the step-by-step recommendations generated by participants at a conference on the implementation of class size reduction. It also contains summaries of the commissioned papers on research and practical knowledge about class size reduction. Recommendations focused on the major topic areas of improving organizational and implementation support, professional development focusing on classroom practice, dissemination of the knowledge base about class size, and further research and development needs. The commissioned papers summarized are: (1) "Early and New Findings from Tennessee's Project STAR" (Jayne Boyd-Zaharia and Helen Pate-Bain); (2) "Teacher Aides: An Alternative to Small Classes?" (Jeremy D. Finn, Susan B. Gerber, and Stacey L. Farber); (3) "Why Should Reduced Class Size Lead to Increased Student Achievement?" (Lorin W. Anderson); (4) "Professional Development and Implementation of Class Size Reduction" (Carolyn M. Evertson); (5) "How Might Teachers Make Smaller Classes Better Classes?" (Jere Brophy); (6) "The California Class-Size Reduction Evaluation: Lessons Learned" (George W. Bohrnstedt, Edward W. Wiley, and Brian M. Stecher); (7) "Wisconsin's Student Achievement Guarantee in Education (SAGE) Class-Size Reduction Program: Achievement Effects, Teaching and Classroom Implications" (Alex Molnar, Philip Smith, John Zahorik, Amanda Palmer, Anke Halbach, and Karen Ehrle); (8) "Ten Years of Small Class Size in Burke County, North Carolina" (Pauline Egelson and Patrick Harmon); (9) "Should Class Size Be a Cornerstone for Educational Policy?" (Charles M. Achilles and Jeremy D. Finn); (10) "Using Class-Size Reduction Resources To Create a Learning Community: A Case Report of Gundry Elementary School" (Matthew Hanson); (11) "Part-Time Class Size Reduction at Fall City Elementary" (Kathleen Cotton and Joyce Riha Linik); (12) "Johnson Elementary School: A Case Report" (Caitlin Howley-Rowe); (13) "An Economist's View of Class Size Research" (Alan B. Kreuger); and (14) "School Characteristics and Classroom Practice: Smaller versus Larger Classrooms" (Margaret C. Wang and Judith C. Stull). (SLD)

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The CEIC Review, Vol. 9, No. 2, March 2000

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The National Center on Education in the Inner Cities

The CEIC
REVIEW
A catalyst for merging research, policy, and practice.

Volume 9 • Number 2 • March 2000

How Small Classes Help Teachers Do Their Best
Recommendations from a National Invitational Conference

Margaret C. Wang, Distinguished Professor and Director, Temple University Center for Research in Human Development and Education

Public concerns about the quality of education and the academic achievement of students have spurred increasing national attention by policymakers and e ducators to the use of class size reduction as a school reform strategy for improving student learning. Widespread initiatives on class size reduction are being undertaken by school districts across the country. Significant resources are being spent to hire new teachers and create sufficient classroom space so that classes, mostly in the primary grades, can be reduced in size.

As is often the case with many well-intentioned, "innovative" school reform initiatives, the current push for class size reduction as an improvement strategy has raised pressing questions, such as, what do we know about implementing the class-size reduction policy in diverse school settings; how can we best organize and apply findings from research on teaching and learning to maximize the benefit of small classes; and what are effective ways to disseminate information about what works in implementing class size reduction as a reform strategy for achieving the learning success of an increasingly diverse student population schools are challenged to serve?

At the classroom and school levels, teachers and administrators are faced with the challenge of how to take optimal advantage of small classes to significantly improve student learning. How do (or should) teachers teach differently to small classes? What kinds of professional development support are required to bring about the intended changes in classroom practices in the service of student success? What strategies are being implemented to address the problem of the shortage of qualified teachers needed to staff the additional classes required to implement the class-size reduction policy mandate? Policymakers, school administrators, and parents have raised serious concerns about the importance of teacher quality regardless of class size, and about alternative means for accomplishing the same goals (e.g., "emergency certification" programs, utilizing teaching assistants in larger classes, etc.). These concerns are particularly pressing for schools in urban communities with high concentrations of students from educationally and economically disadvantaged backgrounds—where recruitment and retaining highly skilled teachers is a major problem and one source of schools' failure to provide a quality education for those who need one the most.

It is in this context of taking stock of what we know from research and practical applications of class size reduction to significantly improve the schools' capacity to ensure high standards of student achievement that a national invitational conference on the implementation of class size reduction was held. The conference, cosponsored by the U.S. Department of Education and the Laboratory for Student Success (LSS), the Mid-Atlantic Regional Educational Laboratory at Temple University Center for Research in Human Development and Education (CRHDE), provided a forum for a national dialogue on how to advance the current state of practice to achieve schooling success of the increasingly diverse student population schools today are responsible to educate. Leading educators, policymakers, and researchers in the nation gathered at the conference to discuss what can be learned from early implementation of the class-size reduction strategy as a reform effort to improve teaching and learning in

The National Center on Education in the Inner Cities (CEIC) is a unit in the Temple University Center for Research in Human Development and Education, an interdisciplinary center devoted to fostering healthy developmental and educational success of children and families in this nation's urban communities. Publication of this issue of CEIC *Review* is supported in part by the Laboratory for Student Success through a grant from the U.S. Department of Education. The opinions expressed do not necessarily reflect the position of the supporting agencies, and no official endorsement should be inferred. Inquiries about the work of the Center should be sent to Information Services, CRHDE, Temple University, 1301 Cecil B. Moore Avenue, Philadelphia, PA 19122-6091. Copyright © 2000

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schools; and delineate what schools, states, and the federal government can do to advance what we know from research and practical applications that work in charting next steps to significantly improve instruction and learning in our nation's schools.

In addition to discussing the implications of the findings reported in the commissioned papers, panels of practitioners shared their experiences and lessons learned from implementation of class size reduction as a reform strategy by states and local schools, focusing on specific strategies for more efficient use of school time in small classes, effective teaching practices and professional development concerns, and evaluation of program implementation and outcomes.

This issue of the *CEIC Review* provides a synopsis of the next-step recommendations generated by participants at the conference and summaries of the commissioned conference papers on the research and practical knowledge about class size reduction by leading scholars and educators.

Improving Capacity for Implementing Class Size Reduction as a Reform Strategy: Next Step Recommendations

While there were divergent opinions on the specific next-step strategies expressed by the conference participants, substantial consensus emerged through small work groups. The recommendations focused on four major topical areas: improving organizational and implementation support; professional development focusing on effective classroom practice; strategies for broad-based dissemination of the knowledge base; and further research and development needs.

Implementation Support

Implementation-related issues were discussed with the goal of delineating what is known from research and practical applications of class size reduction as a reform strategy to improve student achievement and how best to overcome the practical obstacles that many districts confront. It was generally agreed that:

- an adequate infrastructure is necessary to support class size reduction and the many new classes it yields;
- an adequate supply of properly trained teachers is necessary to teach the new classes; and
- the speed with which a class-size reduction program is implemented should be based on not only the availability of buildings and teachers, but also the community's understanding and acceptance of how the program can benefit the students and community, today and in the future.

Specific recommendations on next-step strategies to scale up implementation support included:

- consider phasing in reduced-class-size programs one grade at a time as a strategy to overcome the capacity problem in implementing the class-size reduction policy;
- establish districtwide and schoolwide task forces that consist of parents, school staff, and other stakeholders to disseminate knowledge-based information on the benefits of small classes in improving student learning and serve as advocates for the implementation of class-size reduction policy at state, district, and local school levels;
- host visitations of legislators and school board members to observe class-size reduction models in action; and
- hold regular meetings to inform parents, community leaders and policymakers on the implementation progress and data that show positive impact on student learning as the result of implementing small classes in their respective schools.

Professional Development Focusing on Classroom Practice

Classroom practices and teacher expertise required to maximize the potential benefits of small classes were at the core of discussion of next-step strategies at the conference. Major recommendations emerged from the deliberations from the varied perspectives of teachers, administrators, researchers, and policymakers at the conference, including the following:

- systemic evaluation of the various configurations of class size that have been tried, including such alternative strategies as team teaching, to reduce the pupil–teacher ratio;
- assess alternative instructional practices to determine if class size reduction is the most desirable practice;
- provide adequate training and professional development in order to optimize the potential for a program to succeed. In programs where little or no training is provided, an experienced, highly trained staff must already be in place;
- align teaching practices with the class-size reduction strategy being implemented. Small classes should enable teachers to cover material in greater depth than they do in larger classes;
- target adequate professional development support to implementation and instructional expertise so teachers can take full advantage of the opportunities afforded by smaller class sizes;
- strengthen teacher expertise in linking assessment and instruction—how to use assessment results to design learning plans that are responsive to student learning

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needs and meeting achievement standards, and sharing data-based information with other school staff, students, and parents;

- devote time and attention to reviewing overall learning progress of the students. Provide feedback to students in instructionally meaningful ways to improve student understanding of his/her own learning progress and needs. Forge teaming and instructional collaboration with other teachers to improve instructional effectiveness and efficiency;
- employ highly trained educational professionals to provide professional development of the school staff, focussing on improved instructional practices. Align university teacher preparation coursework with professional development needs for improving classroom practices in small classes and provide systematic professional development of paraprofessionals to function as teacher assistants;
- establish peer coaching programs that enable highly skilled master teachers to share their expertise and spend time modeling and assisting their colleagues in achieving implementation success in their schools/districts; and
- provide regular professional development opportunities for both teachers and administrators so that they can keep abreast of the latest research and practical applications found to be highly effective in improving student learning in small classes.

Dissemination of the Knowledge Base

Designing and implementing widespread dissemination of the knowledge base on the benefit of small classes to ensure high standards of achievement of each student was considered as an essential next-step task in advancing the implementation of the class-size reduction policy at state and local levels. It was concluded that to garner support for class-size reduction policy the public needs to be educated about class-size reduction programs, the support needed to achieve successful implementation, and the benefits of the program in improving teaching and learning in schools. Policymakers, educators, and administrators should work together in keeping all concerned updated about the latest research, recommendations, and best practices; and above all, the positive impact of small classes on student learning must be better publicized.

Specific strategies to implement widespread delivery of information regarding best practices and research findings on class size reduction for school reform include:

- create a communication network, including an interactive web site, to enable educators in the field and at universities to share information about class-size reduction research findings and practical applications that work;
- disseminate information in usable and useful forms, such as a CD containing information about case studies, implementation, policy, research, and findings;
- publish policy and research briefs on what works to inform educators, policymakers, and the public in targeted ways;
- disseminate guidelines in packet form that provide easy access to information on how to approach and address class size implementation issues, targeted for legislators and school board members;
- hold a series of similar regional conferences on "How Small Classes Help Teachers Do Their Best" to initiate dialogue among stakeholders at regional and local levels;
- aggressively seek opportunities to disseminate "what we know about small class size" through the popular press to ensure knowledge-based information reaches the public;
- disseminate information on evaluation design and measures of the impact of class size reduction to school and district personnel;
- make special efforts to inform parents on the positive findings on student learning as a result of class size reduction. Build widespread support for class size reduction as a school reform strategy; and
- include dissemination of effective practices to practitioners as an integral effort to help schools make informed decisions on resource utilization, deployment of personnel, and school reorganization design.

Research and Development Needs

Participants at the conference called for further research and development focusing particularly on ways to increase our understanding of why small classes work and the conditions under which they work best. The following were identified as priority areas for further research and development:

- *Class configurations*— investigate which class sizes and configurations have the greatest impact on student learning.
- *Teacher quality and class size*—examine teacher retention, recall former teachers, and improve training for new teachers.
- *Classroom management*—determine the effect of space management, peer interactions in small classes, and classroom learning communities on student learning.
- *Teacher incentives*—focus on the role of class size, professional development, and salary.
- *Administrative action*—study the effect of class size implementation on accountability.
- *Student self-direction and discipline*—explore the linkage between reduced class size and student development in nonacademic, but highly valued, student outcomes.

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Early and New Findings from Tennessee's Project STAR

Jayne Boyd-Zaharias and Helen Pate-Bain, Health and Education Research Operative Services, Inc.

The idea of reduced class size stems from the philosophy that a perfect educational setting is comprised of one-on-one interactions between a student and a teacher. If one-on-one teaching is the best educational environment, then common logic would assume that, as the number of students per teacher decreases, student learning increases.

Research has shown that reduced class sizes benefit student learning most when: the number of students in class is 15 or less, and the students are below the age of 12.

Background On Project STAR

The Student/Teacher Achievement Ratio (STAR) study was a statewide, four-year research project conducted in Tennessee to compare three class-size conditions: small classes, regular-size classes, and regular-size classes with a full-time teacher aide. The key features of the STAR experiment were as follows:

- All schools with K-3 grade levels were invited to participate.
- Each school included in the study was required to have enough students to form at least one of each of the three class types: small (13-17 students), regular (22-26 students), and regular with a full-time teacher aide (22-26 students) to accommodate the within-school design.
- Schools from inner-city, rural, urban, and suburban locations were included in the experiment.
- All students and teachers were randomly assigned to their class type.
- Investigators followed the standard confidentiality and human subjects' research procedures.
- The legislation made it clear that children would not receive fewer services than normal because of the experiment.
- Achievement testing (the Basic Skills First and Stanford Achievement Test) was carefully monitored.
- An outside consultant was contracted to perform all primary statistical analyses.
- Teacher aides were required to have the necessary minimal state qualifications.
- All STAR teachers were certified.

General Findings

Kindergarten through Third Grade

At each grade level (K-3), across all school locations (rural, urban, inner-city, suburban), on every achievement measure (criterion-referenced and norm-referenced tests), and for all subjects (reading, mathematics, science, social science, language, study skills) the small-class students exceeded their peers in regular and regular/aide classes.

Inner-city and minority students experienced the largest advantages. Both STAR and independent researchers have analyzed the original STAR (K-3) database. They have extracted specific sample selections from the database and have applied different statistical techniques. The findings have consistently shown that STAR small classes helped children succeed during early elementary school (grades K-3).

Middle School Results

Results from STAR follow-up studies have indicated that the benefits of small K-3 classes continue through subsequent years of schooling.

At the end of Grade 7 (four years after students exited small classes), students who had attended K-3 small classes were from 4 to 8 months ahead of their peers who had attended STAR regular-size classes. No significant differences were found for students who had been assigned to STAR classes with teacher aides.

High School and Beyond

Preliminary results show significant differences among the three groups (small, regular, and regular/aide) that favored the students who had attended the small classes.

Recent research shows that students who attended STAR small classes in K-3 are more likely to complete college entrance exams. Perhaps the most significant finding from this research is that small classes appear to cut the Black-White gap in college test-taking by more than half (54%).

Summary and Conclusions

We now know that K-3 small classes make a statistically and educationally significant difference for children. We know that the advantages of attending small classes in K-3 carry over into later grades. Finally, the STAR subsidiary study of quality teaching indicates that small classes provide teachers with the environment and workload they need in order to put forth their best efforts. We believe this is why small classes work.

We view education not as a mass-production effort, but as a personal and individual experience. Class-size research is not an attempt to reduce class size. At best it is an effort to find appropriate caseloads for teachers. STAR research shows us that if we provide teachers with an appropriate student load, it will make possible the individualized and personalized instruction that is the basis of sound education.

Teacher Aides: An Alternative to Small Classes?

Jeremy D. Finn, Susan B. Gerber, and Stacey L. Farber, State University of New York at Buffalo
Charles M. Achilles, Eastern Michigan University

There has been very little research on the roles and impacts of teaching assistants, and much of the research that has been conducted suffers from significant methodological deficiencies. This article summarizes the findings from a program of research we are conducting to understand better the functions that paraprofessionals typically perform in elementary classrooms and the benefits that accrue—or *do not* accrue—to students and teachers.

The database of Project STAR (Student/Teacher Achievement Ratio) was used as the base for the analysis of the impact of teacher aides on small classes.

Specifically, this study was designed to examine several ways in which teaching assistants may be valuable: if they help students academically or behaviorally.

Major Findings

Question 1: Do classroom paraprofessionals have a positive impact on pupils' academic achievement in Grades K through 3?

None of the differences in aide/regular classes was statistically significant in any content area in any grade. In fact, in some instances students in aide classes performed more poorly than did their counterparts in non-aide classes. The addition of a teaching assistant to a primary-grade classroom does not affect students' achievement any differently than classes of similar size without an aide.

Question 2: Do classroom paraprofessionals in the early grades (K-3) have a positive impact on pupils' classroom behavior in later grades (4, 8)?

It appears that participating in a teacher-aide class in kindergarten through Grade 3 has no positive effect on students' learning behaviors in Grade 4. In contrast, students attending small classes in K-3 have significantly better learning behaviors in Grade 4 than students in aide classes. Furthermore, there were no lasting effects on teacher-reported student learning behaviors in Grade 8 regardless of whether the K-3 classes did or did not have full-time teaching assistants or were full-sized or reduced in size.

Question 3: Do teachers report that their teaching burdens are reduced when teacher aides are assigned to them?

In general, teachers perceived that the presence of teacher aides has little effect on their teaching burdens. The differences between regular classes and teacher-aide classes and between small classes and teacher-aide classes are minimal. However, the data show that the presence of a teaching assistant in classes with either a low percentage of minority students or a high percentage of minority students does not reduce any problems the teacher perceives in controlling the class' behavior, engaging students in productive learning activities, or affecting students' attitudes toward school subjects.

Question 4: Do teachers report that their teaching burdens are reduced when teacher aides perform certain functions in the classroom?

Neither teachers' years of experience nor the nature of the tasks performed by aides were found to be significantly related to teachers' reports of the frequency *or* bothersomeness of problems with time management, controlling the class' behavior, engaging students in productive learning activities, or encouraging positive attitudes.

Conclusions and Discussion

The findings of no academic benefits in general, no advantage in terms of pupil behavior, and no reduction in the problems encountered by classroom teachers have profound implications, especially given the high cost of employing teaching assistants. The following are some alternative ways of making better use of classroom aides: (a) prescribe and monitor limited roles and responsibilities for teaching assistants; (b) reallocate resources from this sector to programs with demonstrated efficacy; and (c) modify procedures for selecting and preparing teacher aides so that they provide true, recognizable advantages to students and teachers.

If paraprofessionals are to make contributions to America's classrooms, we must: (a) define clearly the roles and responsibilities of teaching assistants, perhaps designating subclassifications of paraprofessionals with different functions; (b) identify the necessary job qualifications and hire candidates by those standards; (c) develop an institutionalized program of continuing professional development and training, with formal ongoing evaluation; (d) provide organizational support for teaching assistants; (e) develop effective and attainable career ladders, perhaps leading from the role of teaching assistant to primary teacher; and (f) give particular consideration to preparing aides to work with the increasing numbers of culturally diverse classrooms and students for whom English is a second language.

Without significant change in how classroom aides are utilized in assisting students, the high cost of teaching assistants in this nation represents a serious misuse of resources.

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Why Should Reduced Class Size Lead to Increased Student Achievement?

Lorin W. Anderson, University of South Carolina

Why would we expect reductions in class size to result in greater student achievement? After all, class size is a classroom contextual variable and, like other classroom contextual variables, the number of students in the classroom can only have an indirect effect on student achievement.

To answer this critical "why" question, we need to formulate and test a causal model. The model must begin with reduction in class size, must end with increases in student achievement, and must include, in between, "what teachers and students do in the classroom."

An Initial Formulation

Based on prior research, reduced class size is hypothesized to have a threefold effect: fewer discipline problems, greater knowledge of students by teachers, and greater teacher satisfaction and enthusiasm. These variables, in turn, are expected to result in more individualized instruction which should result in more content being taught to students. Finally, increased content coverage should produce greater student achievement.

The Tenuous Link Between Class Size and Student Achievement

Based on this initial formulation, if reduced class size is to result in greater student achievement, then in the smaller classroom:

- there must be fewer discipline problems;
- teachers must possess a greater knowledge of individual students;
- teachers must be more satisfied and enthusiastic;
- teachers must use more individualized instruction; and
- the curriculum must be completed at a more rapid rate.

Only when all of these condition are in place can we expect class size to impact student achievement.

Empirical Support for the Initial Formulation

By far, the greatest amount of empirical support is for the relationship between reduced class size and fewer discipline problems. There also is empirical support for the relationship between reduced class size and teacher satisfaction and enthusiasm.

Both direct and indirect evidence suggests that teachers in smaller classes are more knowledgeable about their students. The direct evidence comes from interviews with teachers. The indirect evidence is based on the assumption that teachers in small classes provide more appropriate and direct feedback because it is based on a greater understanding of what the students know and do not know.

Most of the research attempts to link individualized instruction directly to class size, rather than to fewer discipline problems, greater knowledge about students, and greater teacher satisfaction and enthusiasm as specified in the model, but there is little evidence to support this direct relationship.

When research focuses on the direct linkage between class size and content coverage, rather than on the intermediate paths, mixed results are found. While some research concludes that more of the curriculum is completed in a shorter period of time in smaller classes, other research finds no relationship between class size and content coverage.

The Redesigned Model

Three specific ways can be tried to redesign a conceptual model to improve our understanding of how reduced class size contributes to improved student achievement. The redesigned model of the initial formulation, based on extant class-size research and the larger body of research on effective classroom practices, would include the following design steps.

Add Variables

Additional variables for the redesigned model include those that have been show to be highly correlated to student achievement, such as: more instructional time, greater teacher effort, knowledge of external tests, greater student engagement in learning, and more in-depth treatment of content.

Rename and Redefine Variables

Rename and redefine selected variables that are included in the initial formulation to better reflect the advances from research and practical applications. For example, the variable "more individualized instruction" should be replaced by "more appropriate, personalized instruction." Another example of redefinition is the use of "greater opportunity to learn" to replace "greater content coverage."

Change Paths

In the initial model, the three primary mediating variables were fewer disciplinary problems, greater knowledge of students, and

greater teacher satisfaction and enthusiasm–all believed to result in greater individualized instruction and thereby improved student achievement. In the redesigned model, each of these variables begins a path of its own. For example, "fewer disciplinary problems" result in "more instructional time" which, in combination with "teacher's knowledge of the external test," produces "greater opportunity to learn." Also, in combination with "more appropriate, personalized instruction" and "greater teacher effort," "more instructional time" produces "greater student engagement in learning" as well as "more in-depth treatment of content."

Issues Raised by the Redesigned Model

In this section, three issues derived from a re-examination of the research within the context of the revised model are explored.

Teaching in Small Classes

The lack of dramatic, observable differences or changes in the way teachers teach in larger and smaller classes has been documented in several studies. The changes that teachers need to make when teaching in smaller classes must occur in the *substance* of teaching, not the *form*. It is not enough for a teacher to simply work one-on-one with a student; what is being communicated during this one-on-one session as well as how it is communicated must be consistent with what the teacher knows about that particular student as well as what the teacher expects the student to learn from the interaction.

Within the redesigned model, there are numerous other examples of the needed shift from form to substance. "More instructional time" must lead to greater student "opportunity to learn." Similarly, "greater student engagement" is not synonymous with time-on-task. "Greater student engagement" encompasses critical qualitative elements, activity and emotion in engagement, a depth of engagement, and self-directedness in engagement.

What smaller classes seem to do is to provide greater opportunities for teachers to make the model work. Increased knowledge, greater satisfaction, sufficient time, and hard work enable teachers to teach better without necessarily teaching differently.

The Proper Balance Between Breadth and Depth of Content Coverage

In smaller classes a desirable balance of breadth and depth of content coverage is more likely to be achieved. Teachers can move along at a rapid or slow pace regardless of the class size. In smaller classes, however, teachers are more able to adjust the pace of instruction based on their increased knowledge of each student's learning progress, an essential component of "more appropriate, personalized instruction."

Whole-class instruction may be necessary to get through the amount of content that teachers believe need to be covered. Individual or small group instruction, on the other hand, may provide the greater depth of coverage that some students need to learn.

Regardless of class size, it seems likely that teachers will continue to use some combination of whole-class, individual, and small-group instruction. The question becomes, "What is the proper balance among them so that the proper balance of breadth and depth of content coverage can be achieved?"

The Hawthorne Effect and Positive Class Size Effects on Achievement

The inclusion of teacher effort in the model raises the specter of the Hawthorne Effect as a possible explanation of the smaller-class-size/greater-student-achievement relationship when and where it exists. The difference between perception and reality of teacher behavior raises serious questions about whether differences in actual teaching practices could account for any of the differences in student achievement. Placing "greater teacher effort" in the model moves it out of the realm of an extraneous variable into a central role in helping us understand how teachers can teach better without teaching differently.

Conclusion

The model is intended as a starting point for meaningful discussions of a conceptual nature. Unfortunately, our methodological advances in educational research have outstripped our conceptual ones. Conceptually speaking, we need to catch up.

The steps discussed for the redefined model speak clearly to the type of research we need and the way in which we should begin to think about teaching in smaller classes. Smaller classes provide opportunities for teachers to teach better; they do not cause teachers to do so. In order to take advantage of these opportunities, teachers must understand the types of changes they need to make when teaching in smaller classes and be helped, via soundly designed, well-implemented professional development programs, to learn how to make these changes.

Professional Development and Implementation of Class Size Reduction

Carolyn M. Evertson, Vanderbilt University

The reduction of class size is one of a number of policy decisions with tremendous potential for direct impact on classroom instruction and student learning; however, descriptive information about how teachers may adapt their practices to take advantage of the benefits of reduced numbers of students is only now emerging. With few exceptions, studies of class size have examined achievement effects, but have not provided rich detail about how class size mediates the type of instruction that enhances student outcomes.

What Should Small Classes Look Like?

Reduction in class size is a structural change in our customary ways of schooling that has tremendous potential for improving how we teach children. Reduced classes may offer teachers the opportunity to teach differently from the way they teach in larger classes. For example, smaller classes may impact teaching in the following ways.

- Teachers may know their students better, interact with them more frequently and individually, and provide more frequent and in-depth feedback to them. Teacher planning can focus more on instructional needs, drawing on richer knowledge of individual strengths and weaknesses, rather than on crowd control.
- Lessons involving a high degree of interaction (setting-up science experiments, problem-solving group assignments) may be more frequent, as setup and management are easier. Group work may be more complex, as groups can have smaller membership, meaning more students have substantial roles and responsibilities and fewer students can hide.
- Room arrangements may be more varied and flexible, as fewer desks yield more available space.
- Parents may be more involved, as teachers find it easier to build stronger relationships with a smaller number of parents.

New Conceptions of Professional Development

The important question may not be what smaller classes should look like, but why they so often look just like larger classes.

While reduced class size is a structural condition that can create possible interactions that support students growth, ways in which teachers can accomplish this are not intuitive. To make substantial changes in teaching practice, teachers must have opportunities to learn about and develop these practices in high-quality professional development and in regular and sustained dialogue with colleagues.

Conceptions of quality professional development for teachers have undergone significant change in the last decade. Educators are moving away from models that require teachers to listen to an expert in the field, interpret how the given information might be useful, and then incorporate what they learn in their classrooms. They are moving toward opportunities based on knowledge about how teachers learn, teachers' perspectives on their own problems of practice, and long-term, time-intensive opportunities for teachers to shift from direct teaching models to learning-centered or student-centered classrooms.

How to Encourage Change

If schools are going to devote substantial energy and resources to reducing class size, the extent of the benefits derived from such efforts may depend in part on how teachers take advantage of smaller class sizes to improve the quality of students' educational experiences.

Future investigations of the effects of reduction in class size will have to include analyses of local and cultural definitions of learning, definitions of what is seen as "good teaching," what knowledge is of most worth, and expectations for how students are to engage in content knowledge. In addition, teachers need long-term support to extend their teaching repertoires and to learn new practices. Professional development that is embedded within the school culture, that is based on systematic problem identification by those involved, that is specific to the issues and problems teachers face in their classrooms, and that supports change in teacher thinking as well as in teaching practice must be present and supported at the system level.

What Do Teachers Need?

Current research concludes that, in the current educational reform movement, there are clear calls for teaching of problem solving, independent learning strategies, learner-centered classrooms, and higher-order thinking skills. To enact these changes in classrooms requires changing current teaching practices to accommodate classroom instructional formats of increasing complexity. Planning for complex, multitask classrooms, where teachers use differentiated tasks and groupings and where teacher decisionmaking is non-routine, is difficult and time-consuming. The reduced demands on time that may exist in smaller classes may create the conditions in which teachers, properly supported, could make the change to more complex instructional strategies. Teachers will need awareness of the possibilities, guidance in planning and management, and institutional/contextual support for the changes. Clearly, appropriate professional development is key.

How Might Teachers Make Smaller Classes Better Classes?

Jere Brophy, Michigan State University

Most of the research and policy discussion on class size has focused on whether reducing class size increases student achievement (with earlier studies yielding mixed results but more recent studies suggesting that it does). Unfortunately, there has been less attention to relationships between class size and the quality of students' classroom experiences.

Reviewers agree that, although benefits are not automatic or universal, both teachers and students tend to be happier and more productive in smaller classes. With fewer students to manage, teachers can manage their classes more easily and effectively. Lessons tend to run more smoothly, with fewer disruptions and more widespread and sustained student engagement. Teachers are better able to keep track of everyone's participation in lessons and progress on assignments. Students get more frequent and extended opportunities to respond to questions or otherwise participate actively in lessons and to receive monitoring and assistance from the teacher when working on assignments.

Teachers can conduct lessons with the whole class without feeling the need to divide the class into groups. These whole-class lessons have a more intimate and involving group feel than they do in larger classes. No one needs to be seated in the far reaches of the room, psychologically removed from the teacher and the ongoing interaction. It is easier to hear and pay attention, there are fewer interruptions, and the discourse can be more sustained and challenging.

During times when students are working on assignments, teachers can monitor their progress more frequently and come to individuals to answer their questions or provide help more quickly. Also, individuals can spread out better and work with fewer distractions. At times when working alone is appropriate or when students collaborate in pairs or small groups, they can be placed farther apart to reduce the degree to which they interfere with the focus of other pairs or small groups.

Because lessons go more smoothly, teachers have time to increase the breadth and depth of content coverage and to enrich the basic curriculum. Finally, teachers have greater opportunity to monitor each student's work on assignments and integrate homework into the ongoing curriculum. This can make for better homework assignments, as well as more extensive and immediate follow-up in class the next day.

Implications for Improving Instruction in Smaller Classes

In general, the research on class size suggests that smaller classes provide opportunities for teachers to establish and maintain friendlier, more engaging learning environments; to deepen or extend the curriculum; to increase the quality of classroom discourse; to have more one-to-one contact with students and keep better track of their progress and learning needs; and to provide more individualized instruction and feedback. The remainder of this paper will consider how such improvements might be accomplished by extending or adapting 12 generic principles of effective instruction.

1. A supportive classroom climate. Smaller classes provide greater opportunity for teachers to get to know their students as individuals and establish productive relationships with their parents.

If they exploit the opportunities presented by smaller classes, teachers will develop more knowledge about the students' home cultures and personal interests, hobbies, experiences, etc., which they then can draw upon in ways that support the cohesiveness of the classroom learning community. In general, smaller classes provide greater opportunity for teachers to foster the kinds of teacher–student and student–student relationships and interactions that make for cohesive and caring learning communities, and teachers should exploit this opportunity when it is presented to them.

2. Opportunity to learn. In general, smaller classes present teachers with opportunities not only to spend less time on classroom management and thus more sustained time on curriculum-related activities, but also to reduce the formality and regimentation of classroom rules and procedures and to broaden the range of learning activities carried out in their classrooms.

3. Curricular alignment. Lessons tend to run more smoothly and with fewer disruptions in smaller classes, which makes it possible for teachers to broaden or deepen the curriculum.

Offering a curriculum composed of networks of connected content structured around powerful ideas (rather than parades of disconnected facts or skills exercises) provides a basis for develop-

ing motivation to learn because it ensures that what the students are asked to learn is worth learning.

4. Establishing learning orientations. This principle is not implemented much differently in smaller classes than in larger ones except that, where relevant, teachers can take more time to ask questions designed to stimulate students' thinking about the topic and help them relate it to their prior knowledge.

5. Coherent content. Smaller classes make it easier for teachers to explain content clearly and develop it with emphasis on its structure and connections. The teacher can provide more individualized monitoring and assistance once the students begin work on follow-up assignments.

6. Thoughtful discourse. To take advantage of the opportunities that smaller classes present for structuring such thoughtful discourse, teachers will need to (a) keep the major goals and big ideas of the unit and lesson in mind and plan questions accordingly; (b) establish more intimate physical settings by seating students close together and arranging them in a circular or semicircular pattern (within what is possible given the classroom's furnishings); and (c) shift the emphasis from recitation and assessment of knowledge to discussion and construction of knowledge, and help students learn to shift their roles in the discourse accordingly.

7. Practice and application activities. With respect to practice and application activities, the teachers can take whatever time may be needed to clarify the purposes and goals of activities and assignments, model responses to them or lead the class in working practice examples before releasing students to work on their own, and then circulate to monitor progress and provide help as needed.

Because they have fewer students to monitor, teachers can more closely track the progress of individual students and thus intervene more quickly to provide feedback or assistance.

Finally, teachers in smaller classes can make homework a more substantial and better-integrated part of the curriculum than it is in most classes.

8. Scaffolding students' task engagement. Smaller classes make it easier for teachers to consistently offer high-quality activities and assignments and provide optional scaffolding of their students' learning.

9. Strategy teaching. Smaller classes provide teachers with more opportunities to work with the class as a whole or with selected subgroups or individuals to teach them strategies for self-regulating their learning. Some of this can be accomplished through brief interactions designed to get students off to a good start in working on assignments.

10. Cooperative learning. Smaller classes make it easier to arrange for pairs or small groups of students to disperse to different parts of the classroom and engage in collaborative learning or problem-solving activities with minimal interference from other pairs or groups.

11. Goal-oriented assessment. Smaller classes provide opportunities for teachers to assess student progress more effectively in at least three ways. First, more assessment information can be gleaned through everyday lessons and activities because teachers can call on each student more frequently and monitor individual students' work on assignments more closely.

Second, smaller classes make it more feasible for teachers to use laboratory activities, essay assignments, portfolios, and other assessment tasks that are especially valuable because they call for higher order thinking and applications but require more teacher time spent grading and providing feedback.

Finally, smaller classes make it easier for teachers to follow up on assessment by providing the class as a whole or selected individuals or subgroups with any needed remedial instruction or assignments.

12. Achievement expectations. Teachers with appropriate expectations hold all of their students accountable for participating in lessons and learning activities and for turning in careful and completed work on assignments. They implement the previous 11 principles in teaching the class as a whole, and then supplement this teaching by providing struggling students with whatever extra time, instruction, and encouragement they need to enable them to meet expectations. It is easier for them to give extra attention to struggling students by calling on them more frequently in class, to make sure that they get off to a good start in working on assignments, to monitor them closely and provide timely feedback, to structure and scaffold their work as needed, and to provide remedial instruction or strategy teaching in tutorial or small-group settings.

Conclusion

By reducing the time needed for organizing and managing the classroom, smaller classes make it possible for teachers to enrich the curriculum and attend to individual needs and interests more consistently. This will not happen automatically, however. In order to exploit the opportunities that smaller classes provide, teachers will need to make adjustments in most aspects of their approaches to curriculum, instruction, and assessment.

The California Class-Size Reduction Evaluation: Lessons Learned

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Brian M. Stecher, RAND Corporation

The California class-size reduction (CSR) program was initiated in 1996. An infusion of government funds was made available to reduce class sizes from an average of about 28-30 students to 20 or fewer students in kindergarten through third grade. The experience of California provides important insight into not only the relationship between CSR and student outcomes but also the implications of implementing such a sweeping reform in a large, ethnically diverse state.

This paper details both the challenges encountered during rapid statewide implementation of the California CSR reform as well as the consequences arising from it.

California Class Size Reduction and Student Achievement

Similar to the Tennessee STAR Study, the California CSR reform showed evidence of a positive achievement effect associated with receiving instruction in a reduced-size class; however, the achievement gains found in California were not large. Small but statistically significant differences were found in reading, mathematics, and language.

The California CSR effects are considerably smaller than those found in Tennessee, although the results of California are not necessarily inconsistent with the findings of the Tennessee study, where both timing and duration of CSR had an impact on achievement. There are some interesting differences. In California, for example, the differences in achievement were the same regardless of students' race/ethnicity, family income level, or language status, while in Tennessee, effect sizes for minority students were larger than the effect sizes for non-minority students and effects were consistent across achievement level.

Lessons Learned from CSR in California

Lesson No. 1: It is perilous to assume that any single policy intervention will fully solve a long-developing problem and will do so with no negative consequences. The massive introduction of the CSR initiative had deleterious effects on the types of teachers hired, classroom space, and financial resources in a number of districts and schools. When states or districts plan on introducing a policy intervention, it is important to take into account how other elements in the system might be affected.

Lesson No. 2: Before implementing CSR on a large scale, be certain there is a sufficient number of qualified teachers to staff the newly created classes and a sufficient amount of classroom space to house the new classes.

Lesson No. 3: When designing a class-size reduction policy, consider the financial needs of districts based on the types of student populations they serve. One possibility in California was to have designed a staggered implementation policy where the most needy districts implemented the program in the first year, thereby getting first access to the pool of available teachers, followed by implementation in less needy districts in the second and succeeding years. Another possibility would have been to supplement the CSR program with funds that would be distributed to districts on the basis of need, but with the proviso that they had to be used to provide an incentive to recruit teachers to these difficult-to-serve areas.

Lesson No. 4: The formula used to qualify for CSR funding should have some flexibility. For example, the criterion for receiving CSR funding could be changed to award funds to schools with an average of 20 students per class, so long as no classroom has over 22 students.

Lesson No. 5: We need more research on understanding what classroom practices are most effective in small classrooms. Once we better understand what works, it then needs to be incorporated into teacher training programs for new teachers and into professional development courses.

Lesson No. 6: The cost-effectiveness of CSR needs to be determined not only by examining achievement outcomes, but by other outcomes such as student behavior, parent engagement in their children's education, teacher retention, and so forth. These outcomes have to be compared to the cost-effectiveness of alternative interventions whether they are at the classroom level or at the school level.

Some Concluding Thoughts and Caveats

The best evidence we have for the positive effects of class-size reduction comes from the Tennessee STAR study. The initial achievement effects observed in the lower grades continue to be observed well into high school. It is especially noteworthy that the added advantage of CSR for minority and inner-city children continues into high school as well. The expectation of realizing these results in future CSR implementations underscores the importance of meeting the "scope conditions" of the Tennessee experiment. One must have an adequate pool of qualified teachers and the space to hold the increased number of classes. Furthermore, since one cannot randomly assign teachers to schools or classrooms in large-scale implementations of CSR, incentives or other mechanisms must be used to ensure that the average quality of teachers is the same regardless of school demographics. Finally, the issue of cost-effectiveness also must be considered.

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Wisconsin's Student Achievement Guarantee in Education (SAGE) Class-Size Reduction Program: Achievement Effects, Teaching and Classroom Implications

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This article reports the impact of reduced class size on student achievement and classroom events during the first two years of Wisconsin's Student Achievement Guarantee in Education (SAGE) program. The SAGE program was designed to improve the academic achievement of Wisconsin children living in poverty by:

- reducing class size to 15 students per teacher beginning with kindergarten and first grade in the 1996-97 school year;
- establishing "lighted schoolhouses" open from early in the morning until late in the evening;
- developing rigorous curricula; and
- creating a system of staff development and professional accountability.

To determine the impact on student achievement of SAGE class size reductions, the evaluation uses a quasi-experimental, comparative change design. Comparison schools had normal size classes, but resembled SAGE schools in family income, achievement in reading, K-3 enrollment, and racial composition.

A number of instruments were used as part of the evaluation, including: Comprehensive Test of Basic Skills (CTBS), student profiles, classroom organization profile, principal interviews, teacher questionnaires, teacher activity logs, student participation questionnaires, classroom observations and teacher interviews.

Findings on Student Achievement

First Grade Results

Descriptive Statistics. Inferential tests comparing pretest (fall) scores for the SAGE and comparison groups showed no significant differences for either cohort. Tests comparing post-test (spring) scores for the SAGE and comparison groups revealed significant differences ($p<.05$) on all test scores for both cohorts.

Regression Analysis Results. For all analyses, membership in a SAGE school emerges as a significant predictor of student achievement on the post-test, while controlling for pretest scores, family income, school attendance, and race/ethnicity. The magnitude of the effect of SAGE on student achievement ranged from 3 to 7 points.

Membership in SAGE schools has a consistently positive, statistically significant effect on achievement on the CTBS.

African-American Students. African-American students comprise the largest group of valid test scores among minority students. African-American SAGE students scored lower on the CTBS pretest than African-American comparison students. However, on the post-test African-American SAGE students scored higher than African-American comparison-school students on every subtest and on total scale score.

African-American students scored significantly lower than white students on the CTBS pretest total scale score and achieved greater gains on the CTBS total scale score than white SAGE students from pre- to post-test, closing the achievement gap. In contrast, African American students in comparison schools achieved lesser gains than their White counterparts and the achievement gap widened.

Second Grade Results

Descriptive Statistics. Analyses were conducted to assess the impact of SAGE on the 1997-98 second-grade CTBS Complete Battery, Terra Nova Level 12 post-test results. Second-grade post-test results are compared to the first-grade pretest, as well as first-grade post-test.

Both the first-grade pretest and the first-grade post-test served as a baseline for the second-grade analysis.

The differences between the scores of SAGE students and comparison students on the first-grade pretest were not found to be statistically significant at the .05 level. Therefore, any differences between the first-grade pretest and the second-grade test can be more confidently attributed to the SAGE intervention. The differences between SAGE schools and comparison schools on the first-grade post-test are found to be significant on all scores. Thus, any conclusions discussed regarding second-grade results must take into account the effects of the SAGE program while these students were in first grade.

Regression Analysis Results. When either the first-grade pretest or the first-grade post-test is used as the predictor variable, membership in SAGE emerges as a significant predictor of student achievement on the total score and for all sub-tests except reading.

African-American Students. African-American SAGE students scored higher than comparison school students on every subtest and on the total scale score. However, the differences between SAGE and comparison students on the second-grade test scores are not statistically significant. When using the first-grade pretest as the baseline score, statistically significant change scores are found on all scores except reading. However, using the first-grade post-test as the baseline score shows no statistically significant differences between SAGE and comparison schools.

African-American students scored lower than White students on the first-grade pretest total scale score. This result is statistically significant for both SAGE and comparison schools, though the gap between African Americans and Whites is larger in SAGE schools. The change from first-grade post-test to the second-grade test shows that the SAGE African Americans kept pace with White students, but did not further close the achievement gap in second grade.

The Impact of Reducing Class Size on Teaching and Classroom Organization

The results from the 1997-98 teacher interview, classroom observation, teacher log, and teacher questionnaire support and extend those obtained in 1996-97. They demonstrate that the major change that takes place in teaching when teachers teach a reduced-size class is not a total adoption of more student-centered teaching, but a focus on students as individuals. Many of the methods that teachers use may be the same methods that they have used in normal-size classrooms. The difference is that now the methods are directed at individuals much more frequently. Teachers know each student's learning needs, correct misunderstanding instantly, and move ahead when the time is right.

Few differences over the year in grade level and in type of classroom were revealed in classroom data from any of the instruments. A tentative explanation is that the apparent lack of major differences in teaching small size classes over time, by grade level, and by types of SAGE classrooms may be related to the possibility that changes in teaching occur quickly at the start of the school year, and occur for most teachers in a similar way. The teacher-centered approach that they had been using is repackaged for individual distribution. Small class size does not demand learning something new; it permits teachers to do what they know is the right thing to do.

SAGE classroom data from 1997-98 and 1996-97 suggest the need to focus future study of classroom events specifically on the themes that have emerged; individualization needs to be examined in greater depth, as do other aspects of teaching in reduced-size classes.

Discussion

After two years, the impact of reduced class size in Wisconsin's SAGE program appears to be generally consistent with the results reported by the Tennessee STAR study.

The size of the SAGE evaluation and the strength of the SAGE results suggest that class-size reduction in early grades results in significant gains in student achievement. The results of analyses of classroom-level qualitative data suggest that teachers in SAGE classrooms have greater knowledge of each of their students, spend little time managing their classes, have more time for instruction, are more enthusiastic about teaching, and individualize instruction utilizing a primarily teacher-centered approach.

It is important to note that all of the generalizations provided in the quantitative analyses are based on aggregated results. On average one can certainly expect a small class to set the stage for better achievement, but a small class does not necessarily guarantee better achievement.

Most teachers do not appear to need retraining to successfully implement a reduced size class program. The change to a small class did not require teachers to alter appreciably their basic teacher-centered teaching style. It permitted teachers to focus on individuals, and provided the opportunity to become the type of teacher that they value while using the classroom behaviors they already possess. Retraining may be beneficial for team-taught SAGE classrooms. Some team teachers reported that suggestions for sharing a room would have been helpful. Most, however, adapted quickly, and have come to view SAGE teaming in a positive light.

Because all of the reduced class size configurations stressed individualization, schools do not need additional classroom space to successfully implement a reduced size class program. Noise or class movement was not reported to be a problem in shared classrooms and team-taught classrooms were seen as having advantages over one-teacher classrooms including collegial sharing, teaching to one's strength, and joint student assessment. Regardless of classroom configuration, SAGE teachers taught students through tutoring situations and small needs-based groups, as well as through total group situations where student-teacher dialogue in reduced size classes is pervasive.

Ten Years of Small Class Size in Burke County, North Carolina

Pauline Egelson and Patrick Harmon, Southeastern Regional Vision for Education

For the past 10 years, educators from Burke County Schools, North Carolina, have had class sizes of less than 18 in their first-, second-, and third-grade classrooms. Why would educators and community leaders in a relatively poor community decide to reduce the number of students in primary-grade classes without an outside mandate? This article will discuss this as well as how the school system reduced student numbers in primary classrooms; how teachers were prepared for the initiative; what classrooms look like as a result of small class size; and what the results have been of this initiative.

Background

Burke County is the 25th largest of 117 school systems in the state, with 14,500 students. The system consists of 17 elementary schools, four middle schools, two high schools, an alternative school, and an exceptional children's school.

A small-class-size pilot program in first-grade classrooms was launched in four schools during the 1991-92 school year to increase student achievement in reading and mathematics. Although the results were positive, overall student achievement in the system remained a concern.

Small class size was expanded in 1992-93 to include the first grades in all the elementary schools and the second grades in the four original pilot schools. In 1993-94, all first grades were included, plus second grades in seven schools and third grades in the four pilot schools. In 1994-95, the initiative was expanded to include all second-grade classes. By 1995-96, the project was extended to include the third grades at two additional elementary schools. Today, small class size characterizes all first-, second-, and third-grade classrooms at the 17 elementary schools in Burke County.

Selected Findings

Classroom Process

Findings from two classroom observation studies conducted to examine the effect of class size reduction on classroom processes show consistent positive changes.

In April 1995, Southeastern Regional Vision for Education (SERVE) researchers found that time on task was higher in small-class-size classrooms (one teacher to less than 18 students) than in regular class-size classrooms (one teacher to 24 students) in a comparison of third-grade classrooms in four elementary schools.

In October 1999, SERVE observers returned to Burke County to view first-, second-, and third-grade classrooms in five Burke County elementary schools. The purpose of the observations was to begin to determine the typical instructional strategies employed in the district in these types of classrooms. A composite for each school was initially achieved by determining the number of times an activity or practice was observed in first-, second-, and third-grade classrooms in a school.

Across all schools, there was an emphasis on teacher–student interaction in the form of teacher as coach and instructional feedback. These levels were determined using an estimated percentage of time spent by students in learning activities and their degree of focus on the activity. The results of these observations are particularly significant given the results of previous classroom observations. The high degree of time on task in classrooms remains constant.

Student Achievement: Initial Findings

First-, Second-, and Third-Grade Results (1991-92, 1992-93 and 1993-94). The small class-size students significantly outperformed the control students (statistically and educationally) in both math and reading at the end of first and second grades. The advantage for small-class students continued into the third grade; however, the difference in math was not statistically significant.

Fourth- and Fifth-Grade Results (1994-95 and 1995-96). On the fourth-grade reading test, students who experienced smaller classes from first to third grade continued to outperform their matched peers significantly in reading one year after returning to larger classes. This result was true for the original matched pairs and the rematched pairs. On the fourth-grade math test, small class-size students from the original matched pairs continued to outperform their counterparts significantly. However, the fourth-grade math mean difference between small class-size students who were rematched prior to second grade and their matched peers was not statistically significant.

Two years after leaving smaller classes, students who were matched at the beginning of first grade continued to outperform their matched peers significantly in reading in fifth grade. For the rematched pairs, the mean difference in fifth-grade reading was suggestive of performance differences but was not statistically significant. On the math test, small class-size students from the original matched pairs also continued to outperform their counterparts significantly. The fifth-grade math mean difference between small class-size students who were rematched prior to second grade and their matched peers was again not statistically significant.

Results of Sixth-Grade and Seventh-Grade Longitudinal Analyses

On the 1996-97 sixth-grade North Carolina EOG Tests of reading and math, the achievement advantage

(see **Burke County** on page 18)

Should Class Size Be a Cornerstone for Educational Policy?

Charles M. Achilles, Eastern Michigan University, and Jeremy D. Finn, State University of New York-Buffalo

Appropriately-sized classes for the formative early years of schooling has been a much talked about reform strategy in American education today. Small class size is a desirable condition when examined from practical, business, governmental, and historical perspectives. Why is this still debated?

A Hidden Policy: Class Size as Categorical Aid and the Project Mentality

Class size is a "hidden" policy in American schooling. At one level, class size is visual evidence of the "value" of certain subjects, courses, and curricula. Courses of high value, such as Advanced Placement (AP) classes and classes for the gifted, are small, as are courses for "special" and "challenged" students. General courses, physical education, and study halls are large. The best teachers and teachers with seniority get small classes. Would there be problems with classes for the gifted, AP classes, "alternative" education classes, and special education classes of 25-30? Elitism and small-class benefits thrive, but very selectively.

American education is driven by a project mentality. Projects require people to operate them, to train other people to use them, to evaluate them, and so on. In short, projects have constituencies of vocal adults who profit from them, and are rewarded for being a specialist or consultant with perks such as small classes, fewer classes, less hectic schedules, and minimal accountability for a student's overall performance.

The constant use of projects and the near universal use of small classes in projects suggest that people associated with special efforts in education should agree that small classes help students. How they will actually vote on the class-size question remains to be seen. It may be a test of *cui bono*. If people understand the research results to date and believe that small classes are ingredients of their own project's success, their vote on class size should be yes. Whether the response is a definite yes or a provisional and qualified yes it seems hard to think of a group that would argue that education policy should be built on larger classes.

Common Principles that Emerge from Case Studies of Class-Size Reduction Initiatives

- Students in smaller classes achieve better in many areas: academics, behavior, citizenship, participation, and development.
- Class size and class-size reduction (CSR) studies provide clear and consistent results of positive benefits when the studies are well designed and controlled.
- Teachers are generally positive about smaller classes, as are parents, administrators, and evaluators.
- Teachers get to know students and family better.
- Parent involvement and interest in schooling increase. Parents attend more school-related events.
- Teachers have time to work with student portfolios and special projects.
- There is more individual attention and time on task, and less poor behavior.
- Class size makes a difference in student outcomes (e.g., test scores, behavior) and pupil–teacher ratio (PTR) changes seem to have only minimal effects.
- Students should experience small classes when they first enter schooling.
- Small classes need not be expensive, if done by reallocating resources.
- Early small-class work has lasting benefits into later grades and adulthood.
- Students who start school in small classes are less likely to be retained in grade, be suspended, or drop out of school; they are more likely to take advanced courses, achieve higher grades, and take college-entrance exams.

Indicators that Class-Size Policy Can Improve Education

- Concurrent validity: Good and controlled implementations of small classes show consistent, positive benefits for students and teachers in early school grades.
- Replications: No CSR study has shown negative outcomes for students or others.
- Reanalyses of experimental data (e.g., STAR) show very similar positive results.
- Student academic gains are in all subject areas tested, not just in areas of special work.
- Small-class-treatment benefits last into high school and beyond.

(see **Cornerstone** on page 23)

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Using Class-Size Reduction Resources to Create a Learning Community: A Case Report of Gundry Elementary School

Matthew Hanson, North Central Regional Educational Laboratory

Community schools in Flint, Michigan began reducing the size of their K-3 classes in 1994 when they were awarded a state grant that used "at-risk" funds to lower the student-to-teacher ratio (STR) in classrooms to 17:1. Findings from the evaluation of the state-funded Flint pilot project were modest, but generally positive: scores on the district's reading and math assessments increased in 59% of the schools; moderate increases in parents' involvement in their children's schooling were reported; and teachers indicated that they had more time to participate in professional development activities. In addition, the researchers reported that teachers' and students' attitudes about schooling had improved. These changes, coupled with a reduction in disciplinary problems, had improved the learning environment.

This article provides a brief case discussion of the implementation of class size reduction (CSR) by one elementary school, the Gundry Elementary School.

Gundry School

Gundry, a K-5 school, is situated in a lower-income, urban working-class neighborhood. Eighty-five percent of the students receive free or reduced lunch (compared to 64% of all students in the district).

Gundry used its allotted CSR funds to transform itself from a one classroom, one teacher building into a school that features six large, multi-age Learning Communities (LCs). In LCs, as many as 90 students are assigned to K-2 or 3-5 groupings where they stay—with teams of teachers—for up to three years. Teacher teams include as many as five certified teachers, two student teachers, and one paraprofessional aide. In addition, teams are assisted by school social workers, prevention specialists, and family advocates on an as-needed basis. The size of these teams allows Gundry to maintain low STR within each LC.

The design of LCs is predicated on a determination to maximize flexibility in instruction, where students can be assembled in whole, large, or small groups to meet with teachers and assistants individually for focused or remedial instruction or partner with peers at computer stations or "learning centers" that contain specialized instructional materials. LCs, as they are configured and implemented at the Gundry School, are one example of an alternative approach schools may take to reduce STR within classrooms.

Benefits and Outcomes of Learning Communities

While it may still be too early to tell whether student achievement has improved as a result of Gundry's transformation, it is not too soon to report some of the effects LCs have had on other aspects of schooling. Gundry's principal and teachers reported the following improvements as a result of implementing LCs.

Ability to focus more on individual students

With fewer students vying for their attention, teachers are able to learn more about how their students learn and are better able to formulate an instructional response that is more closely tailored to individual needs. Some teachers indicated that the amount of time they spend on activities related to individual students is the same or less than when they had more students to attend to. However, teachers in smaller classes or where STR is low, may spend less cumulative time on individual students simply because there are fewer. Teachers at Gundry did report that students with special needs receive frequent instruction from teachers, their aides, and/or specialists.

Increased collaboration and decision making among teachers

While most teachers indicated in surveys that they had spent the same amount of time individually planning lessons as they had when they taught in larger classes, they also indicated that they spent more time now planning curriculum collaboratively with members of their LC teams.

Better able to use space and manage classrooms

LCs are large, open spaces that provide a great deal of flexibility for changing room configurations, applying new instructional techniques, and coordinating alternative student groupings. The assignment of up to eight adults per LC contributes to a more closely monitored environment in which issues requiring intervention or disciplinary action can be addressed quickly.

Improved ability to build relationships with students' families

The teachers and principal at Gundry insist that the reduction of STR in LCs has afforded them the opportunity to establish and maintain meaningful interactions with students' families beyond the traditional parent–teacher conference or occasional call home to address disciplinary or learning problems.

Increased sense of professionalism among teachers

Many of the findings in this report, particularly those that relate to collaborative decision making among teachers, the ability to zero in on students' needs and to provide the appropriate instructional response, and to establish and sustain richer

(see **Gundry** on page 20)

Part-Time Class Size Reduction at Fall City Elementary

Kathleen Cotton and Joyce Riha Linik, Northwest Regional Educational Laboratory

A part-time class-size reduction program at Fall City Elementary School has resulted in steadily increasing student achievement.

Factors responsible for Fall City Elementary's improvements and continuing success are numerous. They include:

- A strong emphasis on developing reading, writing, mathematics, and science skills.
- Developing and maintaining positive relationships among all members of the school community—teachers, classified staff, parents, students, and administrators.
- A robust program of parent involvement, with 320 of the 375 families that send their children to the school belonging to the Parent-Teacher-Student Association (PTSA) and 250 parents who volunteer at the school.
- A learning community in which staff have many opportunities to engage in in-service activities, workshops, and conferences, as well as form study groups, share information from educational publications, and engage in long-term learning activities toward agreed-upon goals.
- Long-term engagement with the Northwest Regional Educational Laboratory's (NWREL) Onward to Excellence (OTE) school improvement process which calls for school self-study and profiling, learning about research, identifying goals, implementing and monitoring improvement plans, and celebrating successes—all carried out under the guidance of a school leadership team.

A Modified Block Extension Program

In 1996, Fall City instituted a modified block schedule, whereby the school operates on a six-day rather than a five-day rotation. After a year of working with the six-day schedule, extension classes were added to the schedule to give teachers the opportunity to work with smaller groups of students on a regular basis and to give students the opportunity to participate in enrichment lessons outside the regular classroom. For grades 1-3, students spend 35 minutes every other day in a small class setting. For grades 4 and 5, students spend 40 minutes every third day in a small class setting. This practice requires teachers to divide their classes in half, sending half to the extension classroom and keeping half in their homeroom. They spend the time working with the smaller group, using the time as they see fit to enhance student learning. The reduced student/teacher ratio provides increased opportunity for individualized instruction and feedback.

The teachers find that the extension program has reduced the amount of "busywork" previously required to keep all students engaged while trying to teach to different levels or give students the opportunity to ask questions one-on-one. Now, as teachers focus on the learning of individuals or small groups, other students are actively engaged in learning supplemental material.

Recent Findings: Challenges and Benefits

It has taken time and experience to determine what lessons are best presented to the whole class and which are best for the small class format. Small classes enable some teachers to provide thorough grounding in new concepts, review students' work, and address study skills as needed.

The success of the program thus far can be attributed in part to the openness and willingness of staff to try new things. Fall City teachers reported that classroom management issues are virtually nonexistent in the smaller classes, making for more usable instructional time. They noted that the smaller classes are more relaxed and that they and their students are more engaged in learning activities. Teachers report that students enjoy learning more, are more engaged, and develop close bonds with their teachers.

Team teachers find the flexible nature of the program beneficial. The way they share teaching responsibilities in the small classes can shift depending on the needs of each situation. For example, they will sometimes use small class time to work with students who require extra help to be ready for the statewide achievement test, while sending those who do not need such help to the extension class for enrichment activities.

The school's positive experience with implementing small classes on a limited basis has caused the staff to consider ways to expand the program. Currently on the table for discussion is the prospect of utilizing more of Fall City's teachers in the same manner as the extension teacher. They are considering an arrangement whereby the physical education, music, library, and computer lab teachers would, like the extension teacher, work with half of the students from two different classes at a time, allowing classroom teachers much more time to work with small classes.

Johnson Elementary School: A Case Report

Caitlin Howley-Rowe, Appalachia Educational Laboratory (AEL)

This case report describes the class-size reduction (CSR) initiative of the Franklin Special School District (FSSD) that began in the 1996-97 academic year in Franklin, Tennessee. Johnson Elementary School serves 469 students in kindergarten through fourth grade with the assistance of 40 faculty and 21 support staff. Currently, there are 27 homerooms at Johnson, including three multiage classes that also participate in the school's looping program, in which teachers instruct the same group of students for two years rather than the traditional one year.

Benefits of Smaller Classes at Johnson Elementary

Faculty and school administrators agreed unanimously that smaller classes enhanced teaching and learning. The ability to have students work in small groups was mentioned often by teachers and administrators at Johnson as a benefit.

In addition to enhancing individualized instruction, smaller classes are reported by Johnson teachers to improve evaluation of student work. With fewer students to evaluate, teachers are able to devote more time to assessing work in more depth. This, in turn, enables teachers to redesign instruction to better support each student's learning.

Other benefits include the creation of more informal, intimate learning environments, fewer disciplinary problems, and less social friction between students. Communication with parents is also improved.

Teachers and administrators described important improvements in the instructional process including increased attention to individual students, intensive writing instruction, and the ability for teachers to be more "reflective and innovative."

Similarly, teachers reported having made changes in their daily practice in response to having smaller classes, including being able to work more closely with students and being able to better encourage students to complete quality work. They also reported that they could be more innovative, align curriculum with other teachers, and were better able to use small work groups in the classroom.

Classroom observations at Johnson suggested that teachers used a variety of instructional methods, from direct instruction to collaborative student group work to experiential, hands-on learning. Work centers were used in some classes, and integration of subject matter was observed in one class. In addition, teachers often acted as facilitators of student learning rather than approaching students prescriptively, and school administrators reported that they received fewer disciplinary referrals.

Learning "A New Way of Thinking"

The school administrators cited finding space and funding to accommodate an increasing number of homerooms and offices as a difficulty. One strategy to deal with a lack of space involved using hallways for small groups and housing the kindergarten classes in another district school.

Next Steps

Johnson faculty and administrators reported that they hoped to sustain and extend their success by focusing schoolwide on enhancing reading instruction and assessment. The assistant principal described this new focus as an effort to reduce the fragmentation associated with having many goals and to support literacy as a skill undergirding all other academic pursuits. Other plans included implementing hands-on science curricula in every grade, and increasing parent involvement. Furthermore, professional development is an ongoing strategy to support the positive outcomes seen at Johnson.

Burke County

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of the original matched pair students who experienced smaller classes from first to third grade was again maintained three years after returning to larger classes.

The 1997-98 seventh-grade results for both the original (matched as first-graders) and rematched pairs (matched as second-graders) suggest that the reading and math achievement advantage of the original matched pair students who experienced smaller classes were maintained four years after returning to larger classes.

Discussion

The full implementation of the small-class-size initiative in Burke County brought with it challenges. The school system purchased additional modular units to accommodate the smaller classes and remodeled and reopened older schools that had previously closed. Currently, the cost to hire additional classroom teachers is approximately $2,000,000 a year, which includes fixed charges, instructional materials, and other related costs.

Longitudinal analyses of the first cohort of small-class-size students showed that the academic benefits gained in first through third grade and maintained through fifth grade had been maintained through the end of seventh grade for the original matched pairs in both reading and math. It is anticipated that additional studies of this initial cohort will be conducted as it progresses through high school.

An Economist's View of Class Size Research

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Questions of class size and student performance involve economics, the study of how scarce resources are allocated to produce outputs to satisfy society's competing desires. Teachers are the most important and costly factor of production in education. As with any production function, the output of the "education–production function" (i.e., the relationship between schooling inputs, such as teachers-per-student, and schooling outputs, such as student achievement) is hard to measure. Although it is most commonly measured by student performance on standardized tests, test scores are only weakly related to students' subsequent economic outcomes.

In a series of influential literature summaries published from 1986 to 1998, Eric Hanushek concludes that there is not a strong connection between school input and student performance. Other authors have consequently argued that the presumed failure of the education system to convert inputs into measurable outputs is an indication that incentives in public education are incapable of producing desired results. Critics have used Hanushek's conclusions to argue that bureaucracy, unions, and perverse incentives cause public education to squander resources, severing the link between school inputs and outputs.

This article summarizes a reanalysis of the data in Hanushek's literature reviews and considers the economic implications of the relationship between class size and student performance. Hanushek's conclusions about the performance of the education–production function likely result from his use of a selection rule that takes more estimates from studies analyzing subsamples of a larger data set than from studies using the full data set. This practice inadvertently places a disproportionate amount of weight on studies based on smaller samples. If the various studies in the literature are accorded equal weight, it is found that class size is systematically related to student performance.

Reanalysis of Literature Review

Hanushek's approach equally weights 277 estimates that were extracted from 59 studies, placing more weight on studies that reported more estimates in their published article. In his literature tabulation, therefore, nine studies (15% of the total set of studies) contributed more than seven estimates each (44% of all estimates used). In contrast, the 17 studies from which one estimate was taken represented 29% of studies in the literature and 6% of the total estimates. There are a number of reasons to question the statistical properties of such an approach. Authors who find weak or negative results because of sampling variability or specification errors, for example, may be required by referees to provide additional estimates to probe their findings, whereas authors who use a sample or specification that generates an expected positive effect of smaller classes may devote less effort to reporting additional estimates for subsamples.

If findings are not independent across estimates, then Hanushek's weighting scheme places more weight on insignificant and negative results. Hanushek took only a small number of estimates from studies that showed a clear and consistent association between smaller class sizes and student achievement. For the 17 studies from which Hanushek took only one estimate, for instance, over 70% of the estimates indicate that students tend to perform better in smaller classes, and only 23% indicate a negative effect. The opposite pattern holds for the nine studies from which Hanushek took a total of 123 estimates. Small classes in these studies were associated with lower performance.

The reanalysis included three approaches to partially correct for the oversampling from studies with negative estimates:

- giving the underlying studies (and not the individual estimates) equal weight by assigning to each study the percent of estimates that are positive and significant, positive and insignificant, and so on, and then taking the average of these percentages over the 59 studies;
- assigning the studies a weight equal to the cumulative number of citations the study received as of August 1999, based on a "cited reference search" of the Social Science Citation Index (citation counts are a widely used indicator of quality, and should be a more reliable measure of study quality than the number of estimates reported);
- using regressions to generate predicted percentages for all studies under the hypothetical situation in which one estimate was extracted from each study.

With these changes in the weighting scheme, studies with positive effects of class size are found to be more prevalent than studies with negative effects. Respectively, studies with positive effects are found to be 57% more prevalent, to outweigh those with statistically significant, negative findings by over two to one, and,

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after adjusting for selection, to be twice as likely as studies with negative results.

Several estimates that Hanushek used are from regression models that included expenditures-per-pupil and teachers-per-pupil as separate regressors in the same equation. The interpretation of the teachers-per-pupil variable in these equations is particularly problematic because the variable's effect is primarily identified by differences in teacher pay in such a specification. For example, if one school has a lower pupil–teacher ratio than another, but both have equal expenditures per pupil, the lower pupil–teacher ratio is most likely achieved by lower teacher pay—a factor that could influence student achievement. Many estimates that Hanushek used present similar problems because the underlying studies were not designed to study the effect of class size *per se*, but some other feature of the education process.

Economic Criterion

The effect of school resources on achievement is most commonly measured in terms of student performance on standardized tests. This reanalysis goes one step further and converts such outcome measures into dollars by using the relationship between test scores and future earnings. Several studies have examined the relationship between students' test scores while in school and their subsequent earnings. Based on a review of some of these recent studies, a plausible assumption is that a one standard deviation (SD) increase in either math or reading scores is associated with about 8% higher earnings. The calculations used in the reanalysis suggest that the economic benefits of further reductions in class size in grades K-3 are greater than the costs if a 4% real interest rate is used to discount benefits and costs to present values, and about equal to the costs if a 6% real interest rate is used. The "critical effect size" for the benefit of a reduction from 22 to 15 students to equal the costs is estimated to equal 0.10 standard deviation units if productivity grows at 1% per annum and a 4% real interest rate is used to discount future benefits and costs. This would be a natural null hypothesis against which to test the findings in the literature to judge their economic significance. Without knowing whether the confidence intervals for the estimates in the literature encompass the critical effect size, it is difficult to assess the economic implications of the class size literature as a whole. Although the critical effect size differs across groups with different average earnings, economic considerations suggest that resources would be optimally allocated if they were targeted toward those who benefit the most from smaller classes.

Conclusion

Hanushek and several others have concluded that incentives in education should be changed because of the presumed absence of a relationship between resources and student outcomes for the average school district. This has led many to support a switch to school vouchers, or to a system that penalizes schools with low-achieving students. A change in incentives and enhanced competition among schools might well improve the efficiency of public schools. However, such a conclusion should rest on direct evidence that private schools are more efficacious than public schools, or on evidence that competition improves performance, not on a presumption that public schools as currently constituted fail to transform inputs into positive outputs. Before profound changes in schools are made because of a presumed conclusion that resources are unrelated to achievement, compelling evidence of the efficacy of the proposed changes should be required. ⌘

Gundry

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relationships with students and their families, has contributed to an enhanced sense of professionalism among teachers at Gundry.

Conclusion

The principal and teachers at Gundry School were in unanimous agreement that having fewer students per teacher—whether in a traditional classroom setting or in an LC—was more desirable to having many. However, they also indicated that reducing class size or STR is only one part of the big picture. Several elements of the school culture—and the relationship among them—require as much time and attention as CSR if schools are serious about improving the achievement and lives of its students.

Also, the assembly of large, multi-age groups of students and a team approach to instruction raise some potential problems and concerns. It is not clear what effect, if any, the dynamism that can be observed in Gundry's LCs might have on students who require quieter and more secure, stable, and structured learning environments.

Finally, the teacher team concept has been implemented in ever-increasing numbers of schools across the United States. Team teaching at Gundry has helped to form positive working relationships among school staff and to enhance the professional self-image of teachers. However, teacher teams may undermine the ability of the entire faculty to deal with the business of the whole school; foster tendencies among teachers to compromise rather than risk serious, disruptive disagreements, possibly leading to the watering-down of important instructional issues or strategies; and limit time and opportunity for peer observation and the sharing of ideas among colleagues. ⌘

School Characteristics and Classroom Practice: Smaller Versus Larger Classrooms

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One of the basic arguments for implementing class size reduction (CSR) as a reform strategy to improve student achievement is that teachers would be more likely to employ more effective instructional practices when teaching in small classes, resulting in a classroom process that would be more conducive to improved student learning.

There is a substantial research base that suggests that there are positive effects of small classes. However, the research base on how teachers teach and the nature of classroom learning processes is sorely lacking. It is in the context of examining the differences in what teachers and students do in smaller versus larger classes and how these differences are linked to improved student learning that our study was initiated.

Findings from Comparative Analyses

Using data from the 1998 National Assessment of Educational Progress (NAEP), two sets of analyses were conducted to examine the effect of class size on the classroom process and student achievement in reading for fourth and eighth grade classes. The first analysis focused on examining any differences in teacher and student variables between smaller and larger classes. The second focused on determining which differences had the most significant impact on student achievement.

Differences between smaller and larger classes were examined in three major categories: (a) school characteristics, (b) student learning characteristics, and (c) teacher strategies.

School Characteristics

In both the fourth grade and the eighth grade analyses, students attending private schools were more apt to be in small classes than those attending public schools. While the schools the eighth graders attended were on average almost 40% larger than those attended by the fourth graders, in each case students in small classrooms attended schools that were smaller.

For both fourth and eighth grades, significantly greater spending per student was reported for smaller classes than was the case in the larger classes. Other significant findings include a higher percentage of fourth grade teachers of smaller classes reported students being assigned to classes by ability than did teachers of larger classes; and teachers of larger classes in both the fourth and eighth grade had devoted more hours to professional development in the past two years than those of smaller classes.

Student Learning Characteristics

Students in smaller classes reported regularly talking to friends about school/studies and a greater percentage of students reported reading for fun. No student learning characteristics were found to have statistically significant differences between eighth graders from smaller and larger classes. It is also noteworthy that no achievement differences were found between students in smaller versus larger classes for either fourth or eighth graders.

Teacher Strategies

A greater percentage of teachers of smaller classes in both the fourth and eighth grade reported that they routinely use four or five different types of reading instructions. In addition, while more fourth grade teachers reported spending 300 minutes or more per month in reading instruction, teachers in larger eighth grade classes spent more time on teaching reading than those teaching in smaller classes; more teachers in fourth grade smaller classes routinely used different assessment modalities than those in larger classes; and more eighth grade teachers in smaller classes used four or more types of reading assessments.

Some counter-intuitive patterns on teaching and learning were noted in the findings. For example, a greater percentage of fourth grade teachers in smaller classes reported that they generally use only whole class instruction than was the case for large class fourth grade teachers; and teachers in smaller classes reported that they hardly or never use writing portfolios in assessing students' writing.

Findings from Regression Analysis

We did not find significant differences in student achievement between smaller versus larger reading classes, despite the fact that significant differences were noted in selected teaching strategies that are likely to result in greater student achievement.

Small class size was positively related to student achievement for the fourth graders, but not for the eighth graders.

The Fourth Grade Results

Classroom process variables that were found to be significant in differentiating the teaching practices reported by teachers of smaller and larger fourth grade classes were

included in the regression analysis. Results from the regression analysis, in general, are consistent with the extant research literature on effective practices. For example, data on smaller classes for fourth grade show that whole class instruction lowers achievement while the number of parent/student projects adds to achievement.

The regression results for fourth graders who were in "regular," smaller classes are not dissimilar to those of all fourth graders in regular classes, except for one variable, "the number of different types of assessments routinely used." This finding, along with the finding of the predominant use of only whole class instruction in smaller classes, are important indicators of the need for professional development.

The Eighth Grade Results

A greater number of classroom practices were shown to be related to student achievement both for regular and smaller classes in the eighth grade results. Four factors that were either not significant or had a negative effect on student achievement for the fourth graders, but not for the eighth graders, were: using different types of reading instruction, assigning more written work, grading for quality/creativity, and grading for organization/coherence. This last factor had the largest effect on achievement for those eighth graders in regular small classes. Using only whole class instruction was found to have a negative effect in all cases, especially for those small class eighth graders.

Discussion

This report is based on the preliminary findings from one aspect of our long-term program of research on what helps students learn. What we found was consistent with the growing consensus in the research base on the state of practice and the intuitive appeal of the potential benefits for students attending smaller classes.

We found significant differences in the use of selected instructional strategies that are likely to promote student achievement when used by teachers in smaller classes. We also found some differences in how fourth and eighth grade teachers take advantage of smaller classes by using different instructional strategies known to be effective, but difficult to implement in larger classes.

While our analyses were limited to the configuration and nature of the NAEP data and the very conservative definition of small classes (20 or less) defined by the NAEP data, there are some significant findings that point to the need to pay further attention to the implementation of class size reduction to achieve the presumed benefits of small classes.

One area is that of targeted professional development to ensure implementation of effective practices that are known to foster improved student learning. Benefits to students' learning will not occur unless significant changes are made in what occurs in the teaching process.

Our preliminary findings on what contributes to student achievement in smaller classes suggest some next-step strategies that can result in significant changes in classroom practices. We need to provide targeted, ongoing, and intensive professional development of the school staff, focusing on teaching techniques that have been shown to be effective in addressing the diverse learning needs of individual students.

Class-size reduction as a single, isolated, intervention policy may appeal to teachers and parents. However, class size must be viewed as one variable in the context of a broader-based comprehensive and coherent school-based reform plan to improve student learning.

Educators, policymakers, and researchers have the rare opportunity to put what we know works into operation in schools through investments being made in class-size reduction policies, support for implementing research-based approaches to comprehensive school reform, and the substantial increase in funding for professional development of the teaching force. What we need to focus on is the question of how to best take advantage of the resources and knowledge base on what helps students learn in order to advance the implementation of the class-size reduction initiative and achieve the schooling success of each student.

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Cornerstone
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Do Class-Size Related Improvements Benefit Some Groups of Students More than Others?

- In grades K-3, small classes benefit all students, but minority students get extra test-score benefits.
- Elementary-grade (and preschool) students have demonstrated benefits from small classes. The outcomes for secondary students are less clear—except that early small-class benefits "track" into later grades.
- Although most studies of CSR and of small classes have been in elementary grades, benefits for older students have also been found.
- Early small-class work helps minority students in terms of taking college-entrance exams.

Reasons for Disagreement About the Benefits of Small Classes

- One major reason for "disagreement" resides in the definitional problem between class size reduction and pupil–teacher ratio. Many people do not understand the differences.
- Small classes do not have the constituency that "projects" do. The project mentality has driven U.S. education policy since about 1965.
- Education leaders, already strapped for funds and facing facilities problems don't want to tackle what they perceive as space and personnel problems in small-class implementation.
- Ideological differences overshadow ideas to improve public schools with research-driven results. Instead, groups advocate their own reforms: charters, vouchers, market forces, staff development, and projects.

Effective Ways to Approach Classroom Management and Teaching in a Small Class

- Teachers in small classes can now use what they have been taught about teaching and learning.
- A major effective approach includes increased time on task and individualized attention.
- Teachers can identify student problems and address them quickly with immediate feedback and reteaching as needed.
- Teachers can combine proven education processes with the base of small classes: cooperative learning, cohorts, or looping.

Gaining Optimal Achievement Results in Small-Class Settings

- Research suggests that small-class implementation should begin in kindergarten (or pre-K) and grade 1, and move ahead one grade per year at least to grade 3.
- Use research results to help plan for changes. If small classes reduce dropouts, plan for that; if small classes reduce retention, plan for that.
- Expand the concept of "achievement" to include those outcomes that small classes provide: improved behavior, increased participation and school citizenship, reduced retention in grade and dropout rates, and increased early identification of special-education problems.

The Cumulative Evidence and Benefits

The greatest excitement in using small classes in elementary grades comes from its benefits for young children. Research needs to be done on small classes and closing the achievement gap between groups. What happens when educators combine several elements that research has shown can improve schooling (e.g., small classes, cooperative learning, no grade retention, "looping," and multigrade classrooms)?

Small-class policy should be the foundation for systemic change in education. Research results of small-class outcomes can provide the springboard for measured risk-taking.

Small classes address three key education values and goals. Outcomes from small classes show that small classes are a quality education treatment. If all students are in smaller classes, then all students receive the same policy attention (equality). Small classes also provide an equity dimension: students typically hard to teach, or who are at risk of not doing as well as other less educationally challenged students, get more benefits from the small-class treatment than do above-average students.

Should class size be a cornerstone for education policy? Yes. Class-size policy should not just be a cornerstone, but the foundation of education policy for the early education of America's citizenry. The question of how to make it work is open for discussion, research, and evaluation. Some class-size results have provided ideas about how to implement and evaluate the class-size effort, but the questions will invariably be embedded in context issues.

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